

9 the cross-section of the chamber in a plane perpendicular to the direction of  
10 movement is larger at the first position than at the second position,

11 the change of the cross-section of the chamber is essentially continuous between  
12 the first position and the second position and

13 the cross-section of the chamber is arranged to adapt itself to the cross-section of  
14 the piston.

1 3. A device comprising a combination of a chamber and a piston positioned  
2 inside the chamber, said chamber and said piston relatively movable to each other in a  
3 predetermined direction of movement between a first position and a second position,  
4 wherein

5 the cross-section of the piston in a plane perpendicular to the direction of  
6 movement is larger at a first piston position than at a second piston position,

7 the change of the cross-section of the piston is essentially continuous between the  
8 first piston position and the second piston position,

9 the cross-section of the chamber in a plane perpendicular to the direction of  
10 movement is larger at the first position than at the second position,

11 the change of the cross-section of the chamber is essentially continuous between  
12 the first position and the second position and

13 a cross-section of the chamber and the piston respectively is arranged to adapt  
14 itself to the cross-section of the piston and the chamber, respectively.

1 4. The device comprising a combination of a chamber and a piston of Claim  
2 1 wherein the circumference of the cross-section perpendicular to the direction of  
3 movement of the chamber and/or the piston where at least one part of said chamber  
4 and/or said piston, is constant between and including said first position and said second  
5 position.

1           5.     The device comprising a combination of a chamber and a piston according  
2 to claim 4, wherein said cross-section  
3           consisting of sectors, wherein in each sector the distance between the centerpoint  
4 of the cross-section of the chamber and the outermost limiting surface of the chamber is  
5 larger than the corresponding distance measured along a line separating the sector from  
6 an adjacent sector, and  
7           the change of the shape between two adjacent sectors is essentially continuous.

1           6.     The device comprising a combination of a chamber and a piston according  
2 to claim 1 wherein the cross-section of the chamber is circular at any point between and  
3 including the said first position and second position.


1           7.     The device comprising a combination of a chamber and a piston according  
2 to claim 1 wherein the piston comprises a sealing portion made of an elastically  
3 deformable material and/or a loading portion and/or a support portion.

1           8.     The device comprising a combination of a chamber and a piston according  
2 to claim 7, wherein the sealing portion in cross-section of the piston parallel to the  
3 direction of movement has a general form of an area which is bound by a curve and/or  
4 line with specific predetermined mathematical characteristics in which the said adaptation  
5 of the cross-section of said piston in a plane perpendicular to the direction of movement  
6 corresponds to a change in a value of a characteristic in a direction perpendicular and/or  
7 in a direction of the movement of said piston and/or said chamber.

1           9.     The device comprising a combination of a chamber and a piston according  
2 to claim 8, wherein the sealing portion in a cross-section of the piston in a plane parallel  
3 to the direction of movement has the general form of an area bounded by a rectangular  
4 having a predetermined length of its sides, in which the said adaptation of the cross-  
5 section of the piston in a plane perpendicular to the direction of movement corresponds to  
6 a change in the length of a side of said rectangular perpendicular to the direction of  
7 movement and is accompanied by an opposite change in the length of a side along the  
8 direction of movement.

1           10.    The device comprising a combination of a chamber and a piston according  
2 to claim 9, wherein the change of the length of said side along the direction of movement  
3 is accompanied by a change in the shape of said rectangular.

1           11.    The device comprising a combination of a chamber and a piston according  
2 to claim 8, wherein the sealing portion in a cross-section of the piston in a plane parallel  
3 to the direction of movement has the general form of the obliques of a triangle of which  
4 its perpendicular being parallel with the direction of movement, the obliques of said  
5 triangle extending outwards from said perpendicular in a predetermined angle ( $\alpha_1, \epsilon_1$ )  
6 wherein the said adaptation of the cross-section of the piston in a plane perpendicular to  
7 the direction of movement corresponds to a change in the said predetermined angle ( $\alpha_2,$   
8  $\epsilon_2$ ).




1           12.    The device comprising a combination of a chamber and a piston according  
2 to claim 8, wherein the sealing portion in a cross-section of the piston a plane parallel to  
3 the direction of movement has the general form of an area which is bound by  
4 approximately a triangle, a perpendicular being parallel to the direction of movement and  
5 the obliques of the said triangle extending outwards from said perpendicular in a  
6 predetermined angle  $\phi_1$ , wherein said adaptation of the cross-section of the piston in a  
7 plane perpendicular to the direction of movement corresponds to a change in the said  
8 predetermined angle  $\phi_2$ .

1           13.    The device comprising a combination of a chamber and a piston according  
2 to claim 11, wherein said predefined angle ( $\alpha_1, \epsilon_1, \phi_2$ ) is larger at the first position than at  
3 said second position.

1           14.    The device comprising a combination of a chamber and a piston according  
2 to claim 8, wherein the sealing portion in a cross-section of the piston in a plane parallel  
3 to the direction of movement has the general form of an area which is bound by a circle  
4 having a predetermined radius, a central axis parallel to the direction of movement and,  
5 wherein the said adaptation of the cross-section of the piston in a plane perpendicular to  
6 the direction of movement corresponds to a change in the said radius.

1           15.    The device comprising a combination of a chamber and a piston according  
2 to claim 14, wherein said adaptation is accompanied by an opposite change of the radius  
3 in the direction of movement.

1           16.    The device comprising a combination of a chamber and a piston according  
2 to claim 8, wherein the sealing portion in a cross-section of the piston in a plane parallel  
3 to the direction of movement has the general form of an area which is bounded by a  
4 rhomboid, which has a predetermined length of its axis, one of the axis parallel to the  
5 direction of movement, wherein said adaptation of the cross-section of the piston in a  
6 plane perpendicular to the direction of movement corresponds with a change in the length  
7 of an axis and an opposite change in the length of the other axis.



1           17.    The device comprising a combination of a chamber and a piston according  
2 to claim 8, wherein the sealing portion in a cross-section of the piston in a plane parallel  
3 to the direction of movement has the general form of an area which is bounded by an  
4 ellipse, which has a predetermined length of its axes, one axis parallel to the direction of  
5 movement, wherein said adaptation of the cross-section of the piston in a plane  
6 perpendicular to the direction of movement corresponds with a change in the length of an  
7 axis and an opposite change in the length of the other axis.

1           18.    The device comprising a combination of a chamber and a piston according  
2 to claim 8, wherein the sealing portion in a cross-section of the piston in a plane parallel  
3 to the direction of movement comprises parts (X, Y, Z) which are preformed, having in  
4 between predetermined angles ( $k_1$ ,  $\lambda$ ) where said part X having a predetermined angle  $\eta_1$   
5 with the direction of movement wherein said adaptation of the cross-section of the piston  
6 in a plane perpendicular to the direction of movement corresponds with a change in said  
7 angles ( $k_2$ ,  $\eta_2$ ).

1           19.    The device comprising a combination of a chamber and a piston according  
2 to claim 7, wherein said sealing portion comprise a sealing edge which is engaging the  
3 wall of said chamber, wherein said adaptation additionally is accompanied by a change in  
4 the size and/or shape of said sealing edge under the influence of said loading means.

1           20.    The device comprising a combination of a chamber and a piston according  
2 to claim 19, wherein said loading means provides a spring-force to the sealing edge so  
3 that said piston engages the wall of the chamber with a sealing force.

1           21.    The device comprising a combination of a chamber and a piston according  
2 to claim 20, wherein said loading means comprise:

3           a medium,  
4           a layer of fibers which can freely shear over each other or a layer of a  
5 reinforcement,  
6           said fibers are embedded in a skin made of rubber or a thermoplast,  
7           positioned inside said piston and/or inside the wall of the chamber which has a  
8 predetermined pressure at said first position, and which can have a different pressure at  
9 said second position.

1           22.    The device comprising a combination of a chamber and a piston according  
2 to claim 19 in which said piston is connected to the piston rod for moving the piston in  
3 the direction of movement wherein said piston and/or said chamber comprise loading  
4 regulating means providing a sealing force

5           which adjusts itself so that the sealing edge seals against the wall of the chamber  
6 during said movement between and including said first position and said second position,  
7 and

8           said sealing force depends on the relative position of said piston and said chamber  
9 and/or on the pressure of a medium in the chamber, and/or the operating force, and/or a  
10 spring-force.

1           23.    The device comprising a combination of a chamber and a piston according  
2 to claim 22 in which said piston is connected to a piston rod for moving the piston in the  
3 direction of movement, wherein

4           the piston rod of the piston comprises a channel which is connected by a hole in  
5 the wall of said piston rod to a medium of the piston, so that a medium can be conducted  
6 through said hole,

7           said channel comprises a piston which is engaging said medium by a spring-force.

1           24.    The device comprising a combination of a chamber and a piston according  
2 to claim 22 in which said piston is connected to a piston rod for moving the piston in the  
3 direction of movement, wherein,

4           the piston rod of said piston comprises a channel which is connected by a hole in  
5 the wall of said piston rod to a medium of the piston, so that a medium can be conducted  
6 through said hole,

7           a cap which is connecting the piston to said piston rod comprises a stop for  
8 preventing said piston to disassemble from said piston rod, and

9           said channel comprises a piston which is engaging said medium by the operational  
10 force.

1           25.    The device comprising a combination of a chamber and a piston according  
2 to claim 22 in which said piston is connected to a piston rod for moving the piston in the  
3 direction of movement, wherein

4           the piston rod of the piston comprises a channel which is connected by a hole in  
5 the wall of said piston rod to a medium of the piston, so that a medium can be conducted  
6 through said hole,

7           said channel comprises a piston which is engaging said medium by a spring-force  
8 of a piston which is connected by a piston rod, and which is engaged by a medium in the  
9 chamber.

1           26.    The device comprising a combination of a piston and a chamber according  
2 to claim 1 in which the said piston is connected to the piston rod for moving the piston in  
3 the direction of movement, wherein said piston and/or chamber comprise shape  
4 regulating means.

1           27.    The device comprising a combination of a piston and a chamber according  
2 to claim 26, wherein,

3           a cap is movable over the piston rod in a predetermined direction,

4           defined by a stop or a cap which is fastened to the piston rod,

5 a sealing device and/or an impervious layer which is tightly squeezed between (the  
6 skin and said caps and sealing device prevent the medium or media to escape from the  
7 piston.

1 28. The device comprising a combination of a piston and a chamber according  
2 to claim 27, said movement is damped by a spring, and is limited by (a) stop.

1 29. The combination of a piston and a chamber according to claim 1 in which  
2 said piston is connected to a piston rod for moving the piston in the direction of  
3 movement, wherein:

4 the piston rod comprises an inlet and a channel for conducting pumped gaseous  
5 and/or liquid media into the chamber, and

6 the piston rod further comprises a valve for preventing the pumped gaseous and/or  
7 liquid media from escaping the chamber through said channel.

1 30. The combination of a piston and a chamber according to claim 1 wherein:  
2 the chamber comprises an inlet channel for conducting pumped gaseous and/or  
3 liquid media into said chamber, wherein said inlet channel comprises a valve for  
4 preventing the pumped gaseous and/or liquid media from escaping the chamber through  
5 said inlet channel.

1 31. The device comprising a combination of a chamber and a piston according  
2 to claim 1 in which the chamber comprises an outlet channel and/or an inlet channel for  
3 conducting pumped gaseous and/or liquid media out of the chamber, wherein the second  
4 position is closer to the outlet channel than the first position, so that the cross-section of  
5 the chamber diminishes from the first position towards the second position.

1 32. The device comprising a combination of a chamber and a piston according  
2 to claim 31, wherein said outlet channel comprises a valve for preventing the pumped  
3 gaseous and/or liquid media to be conducted into said chamber.

1           33.    The device comprising a combination of a chamber and a piston according  
2 to claim 1 in which said piston is connected to a piston rod for moving the piston in the  
3 direction of movement, characterized by the fact that said chamber is closed and  
4 comprises a medium which is non-compressible, while said piston comprises valve  
5 means for conducting the said medium.

1           34.    The device comprising a combination of a chamber and a piston according  
2 to claim 1 in which said piston is connected to a piston rod for moving the piston in the  
3 direction of movement, wherein said chamber is closed and comprises a medium which is  
4 compressible between said piston and a wall of said chamber.

1           35.    The device comprising a combination of a chamber and a piston according  
2 to claim 1 in which said piston is connected to a piston rod for moving the piston in the  
3 direction of movement, wherein said device comprises valve means and valve regulating  
4 means in order to selectively conduct a medium in or out of the space between said piston  
5 and said chamber.

1           36.    The device comprising a combination of a chamber and a piston according  
2 to claim 1 in which said piston is connected to a piston rod for moving the piston in the  
3 direction of movement, wherein said chamber or said piston is connected to an axis in  
4 order to transform the translation of the piston and/or the chamber into a rotation, where  
5 the chamber comprises valve means and valve regulating means for selectively  
6 conducting and not conducting a medium to the space between the said piston and said  
7 chamber in order to move said chamber and/or piston.

1           37.    The device comprising a combination of a piston and a chamber according  
2 to claim 22 wherein the pressure inside the piston and/or inside the wall of the chamber is  
3 higher, equal or lower than the pressure in the chamber.

1           38.    The device comprising a combination of a piston and a chamber according  
2 to claim 22, wherein the pressure inside the piston is higher, equal or lower than the  
3 pressure in the wall of the chamber.